

REMARKS

The Office Action dated January 11, 2008 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 12, 15, 18, and 21-41 and 50-53 are currently pending for consideration, of which claims 1, 21, 23-24, 28, 32, 35, and 40-41 are independent. In particular, Applicants have amended independent claim 32 and cancelled claims 42-50 without prejudice or disclaimer. It is respectfully submitted that the claim amendment adds no new subject matter to the present application and serves only to more particularly point out and distinctly claim the subject matter that Applicants regard as the invention, and to better clarify the present application for purposes of appeal. Applicants urge that all grounds for rejection in the Office Action have been addressed and that the present application is currently in condition for allowance in view of the claim amendment, and the following explanations. Therefore, entry of the claim amendment and reconsideration of claims are respectfully requested.

Claim Objections

Claim 32 was objected to because of minor informalities. Applicants have herein amended claim 32 as requested in the Office Action to address the objection. Therefore, Applicants urge that this objection is now moot in view of the current amendment. Withdrawal of this objection and reconsideration of claim 32 are therefore respectfully requested.

The Office Action further objected to claims 1, 21, 23, 24, 28, 32, 35, 40, and 41 because the limitation “the size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of the users” is allegedly comparing the size of a set with bandwidth, and that the compared units are not equivalent. Applicants note that this objection is based on the view that the “size of the set of sequential carriers” should be interpreted to mean the number of sequential carriers in the set. Applicants respectfully disagree with this claim interpretation and, therefore, traverse this objection for the reasons described below.

Applicants note that as used in the current application and within this technical field, the phrase of “the size of a set of sequential subcarriers” is necessarily a bandwidth. Applicants urge that the term “size” should be interpreted with reference to the context in which it is used in the claims and in the present application. For example, in the present application at page 11, paragraph [0047], Applicants disclosed that “The sizes of the sets are typically determined by taking the channel coherence bandwidths of the users into account...If the set size varies, the size of a set is typically determined to be of the order of the coherence bandwidth of the user's channel, or a fraction of the channel coherence bandwidth. (Emphasis Added)” See, also, the present application at FIG. 5, and at paragraphs [0029], [0052], [0054], and [0060] in which the size of the subset is described in the context of a bandwidth. Therefore, Applicant note that the “size” of a set within the present application is expressly defined in terms of a transmission bandwidth.

Furthermore, Applicants urge that since the term “size” is used in the claims in comparison with a bandwidth, it is clear that the term “size” is in reference to the bandwidth of the set of sequential subcarriers. Consequently, the units in the claims are the same, contrary to the contentions made in the Office Action.

Applicants further note that under MPEP 2106, “Office personnel must rely on the applicant’s disclosure to properly determine the meaning of the claims.” *Markman v. Westview Instruments*, 52 F.3d 967, 980, 34 USPQ2d 1321, 1330 (Fed. Cir.) (en banc), aff’d, U.S., 116 S. Ct. 1384 (1996). Claim terms are presumed to have the ordinary and customary meanings attributed to them by those of ordinary skill in the art. *Sunrace Roots Enter. Co. v. SRAM Corp.*, 336 F.3d 1298, 1302, 67 USPQ2d 1438, 1441 (Fed. Cir. 2003); *Brookhill-Wilk LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1298, 67 USPQ2d 1132, 1136 (Fed. Cir. 2003)(“In the absence of an express intent to impart a novel meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by those of ordinary skill in the art.”)

Therefore, Applicants urge that this objection is in clear legal error since the claim interpretation used in the Office Action is clearly contrary to the Applicants’ disclosure and should be withdrawn. Reconsideration and allowance of claims 1, 21, 23, 24, 28, 32, 35, 40, and 41 are therefore respectfully requested.

Claim Rejection Under 35 U.S.C. 112, First Paragraph

Claims 1, 12, 15, 18, 21-53 were rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. The Office Action

alleged that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art had possession of the claimed invention. More specifically, the Office Action asserted that the limitation “the size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users,” is not described in the specification.

As noted above, in the discussion of the Claim Objections, Applicants note that the Office Action has adapted an unreasonable and incorrect interpretation of the “size of set of ... subcarriers.” In particular, Applicant note that the Office Action asserted that this limitation should be interpreted to mean the number of sequential carriers in the set. However, as described above, this claim interpretation is incorrect.

Applicant further note the supposedly unsupported limitation can be found in several places in the specification. For example, paragraph [0029] discusses that the size of a set of sequential subcarriers may be selected from a plurality of predetermined sizes. Paragraph [0052] of the present application describes that the size of the sets is typically of the order of the smallest coherence bandwidth of the users' channels or a fraction of this channel coherence bandwidth. Paragraph [0054] also supports the above-described limitation. Paragraph [0054] states that “If the size of the set of sequential subcarriers, determined using a channel coherence bandwidth, is larger than the system-specific or cell-specific lower limit, then the set size determined using a user channel coherence bandwidth may be used.” Thus, Applicants urge that the claims contain subject matter which is fully supported in the specification in such as way as to reasonably convey to a person of ordinary skill in the art had possession of the claimed invention.

Applicants further note that in one embodiment of the present application described in paragraph [0068] at page 18, $F=2$ in the equation defined in paragraph [0060] of the present application. Given that the set therefore must contain at least two subcarriers when $F=2$ in this equation, then it necessarily follows that in this embodiment, d (the number of subcarriers in the set) is always greater than the number of carriers corresponding to the smallest coherence bandwidth ($N_{\text{carriers}} W_{\text{coh}}/W$), such that the size (*i.e.*, bandwidth) of the set is greater than the smallest coherence bandwidth..

Applicants therefore urge that this rejection is in clear legal error since Applicants' disclosure clearly supports the cited limitation and should be withdrawn. Reconsideration and allowance of claims 1, 12, 15, 18, and 21-41 and 50-53 are therefore respectfully requested.

Rejection under 35 U.S.C. §102(e)

Claims 1, 12, 15, 18, and 21-53 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Publication No. 2004/0081131 (Walton). As described below, Walton fails to disclose each and every limitation of any of the pending claims. Therefore, withdrawal of this grounds of rejection and reconsideration of the pending claims are respectfully requested.

Independent claim 1, upon which claims 12, 15, 18, and 51-53 are dependent, recites a method of allocating subcarriers in a multicarrier modulation communication system. The method includes allocating a plurality of sets of sequential subcarriers to a

plurality of users, wherein the size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 21, upon which claim 22 is dependent, recites a device for controlling multicarrier modulation communications, the device being configured to allocate a plurality of sets of sequential subcarriers to a plurality of users in an allocation period. The size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 23 recites a multicarrier modulation communication system, the multicarrier modulation communication system being configured to allocate a plurality of sets of sequential subcarriers to a plurality of users in an allocation period. The size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 24, upon which claims 25-27 are dependent, recites a method of multicarrier modulation transmission. The method includes transmitting at least one signal relating to at least one set of sequential subcarriers among a plurality of sets of sequential subcarriers allocated in an allocation period to a plurality of users. The size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 28, upon which claims 29-31 are dependent, recites a method of multicarrier modulation reception. The method includes receiving at least one signal relating to at least one set of sequential subcarriers among a plurality of sets of sequential subcarriers allocated to a plurality of users in an allocation period. The size of a set of

sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 32, upon which claims 33-34, 38, and 39 are dependent, recites a device for multicarrier modulation transmission, the device being configured to transmit at least one signal relating to at least one set of sequential subcarriers among a plurality of sets of sequential subcarriers allocated to the plurality of users in an allocation period. The size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 35, from which claims 36 and 37 depend, recites a device for multicarrier modulation reception, the device being configured to receive at least one signal relating to at least one set of sequential subcarriers among a plurality of sets of sequential subcarriers allocated to a plurality of users in an allocation period. The size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.

Independent claim 40 relates to a transmitter. The transmitter includes an allocating unit configured to allocate a plurality of sets of sequential subcarriers in a multicarrier modulation communication system to a plurality of users. The size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users. The transmitter also includes a transmitting unit configured to transmit at least one signal to the users. The signal includes information of at least one of the sets of sequential subcarriers.

Independent claim 41 relates to a receiver that includes a receiving unit configured to receive at least one signal. The signal relates to at least one set of sequential subcarriers in a multicarrier modulation communication system among sets of sequential subcarriers allocated to users. The size of a set of sequential subcarriers is greater than the smallest coherence width of the users. The receive also includes an operating unit configured to operate the receiving unit to use the at least one set of sequential subcarriers.

As will be discussed below, Walton fails to disclose or suggest all of the elements of any of the above presented independent claims or the claims that depend therefrom.

As described in Applicants' prior submissions, Walton generally relates to using orthogonal frequency division multiplexing (OFDM) symbols of different sizes to achieve greater efficiency for OFDM systems. The system traffic may be arranged into different categories (e.g., control data, user data, and pilot data). For each category, one or more OFDM symbols of the proper sizes may be selected for use based on the expected payload size for the traffic in that category. For example; control data may be transmitted using OFDM symbols of a first size, user data may be transmitted using OFDM symbols of the first size and a second size, and pilot data may be transmitted using OFDM symbols of a third size or the first size.

As described in Applicants' prior submissions, Walton fails to disclose or suggest, at least the recitation in claim 1 of "allocating a plurality of sets of sequential subcarriers in a multicarrier modulation communication system to a plurality of users, wherein the

size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users.”

For example, Walton discloses using OFDM symbols of different sizes to minimize cyclic prefix overhead and maximize packing efficiency. See paragraph [0012] of Walton. Walton also discloses that for OFDMA, multiple users share the large OFDM symbol using frequency domain multiplexing. This is achieved by reserving a set of subbands for signaling and allocating different disjoint sets of subbands to different users. See paragraph [0010] of Walton. However, there is no teaching or suggestion in Walton of **allocating** a plurality of sets of sequential subcarriers in a multicarrier modulation communication system to a plurality of users, wherein the wherein the **size** of a set of sequential **subcarriers** is **greater** than the **smallest coherence bandwidth** of the plurality of **users**, as recited in the presently pending claims. (Emphasis Added).

Thus, Applicants urge that Walton fails to disclose or suggest, at least, “allocating a plurality of sets of sequential subcarriers in a multicarrier modulation communication system to a plurality of users, wherein the size of a set of sequential subcarriers is greater than the smallest coherence bandwidth of the plurality of users,” as recited in claim 1 of the present application.

The Office Action continued to allege that Walton, for example, at paragraphs [0031], [0032] and [0125], discloses the use of a set of subbands having a width greater than the smallest coherence bandwidth. Applicants have carefully reviewed these and other sections of Walton and respectfully urge that the Office Action interpretation of Walton is clearly technically incorrect. Contrary to the interpretation of these paragraphs

alleged in the Office Action, Applicants urge that Walton clearly teaches against the use of a set of subbands having a width greater than the smallest coherence bandwidth. Applicants note, for example, that Walton at paragraph Section [0032] states that "the largest OFDM symbol that may be used is typically constrained by the coherence time of the wireless channel, which is the time over which the wireless channel is essentially constant. In other words, Walton clearly discloses that the largest usable OFDM symbol is constrained by the coherence bandwidth, and therefore teaches away from using an OFDM symbol that is larger than the coherence bandwidth, as recited in claim 1 of the present application.

Similarly, Walton at paragraph [0125] discloses using OFDM symbols of different sizes, but provides no disclosure that the size can exceed the coherence bandwidth. Applicants further note that Walton at paragraph [0125] teaches the use of relatively long sets of subbands of the same steering vector obtained for a relatively short set of subbands. Applicants therefore urge that paragraph [0125] of Walton contains no teaching or disclosure contrary to the above-described teaching of section [0032] that discloses using only a set of subbands having a bandwidth smaller than the coherence bandwidth. Furthermore, the last four lines of paragraph [0125] discloses that sets of subbands having a width close (but still less than) to the coherence bandwidth suffer degradation when the SNR is high. Therefore, this disclosure in paragraph [0125] of Walton clearly teaches using a set of subbands having a bandwidth much smaller than the coherence bandwidth.

For at least these reason, Applicants urge that Walton fails to disclose each and every limitation of independent claim 1. As such, it is respectfully requested that the rejection of claim 1 is incorrect and should be withdrawn. Likewise, dependent claims 12, 15, 18, and 51-53 should be allowed on similar grounds, as well as for the respective limitations recited within these claims. Withdrawal of this rejection of claims 1, 12, 15, 18, and 51-53 and reconsideration of these claims in view of the preceding explanations are respectfully requested.

Similarly, independent claims 21, 23, 24, 28, 32, 35, and 40-41, although different in scope from claim 1 and rejected on different grounds, also contains similar recitations related using a set of subbands having a bandwidth larger than the coherence bandwidth. Thus, Walton similarly fails to teach or suggest each and every limitation recited in independent claims 21, 23, 24, 28, 32, 35, and 40-41, and for at least this reason, Applicants urge that the rejection of these claims in view of Walton is clearly improper. Likewise, dependent claims 22, 25-27, 29-31, 33-34, and 36-39 should be allowed on similar grounds, as well as for the respective limitations recited within these claims. Withdrawal of this rejection of claims 21-41 and reconsideration of these claims in view of these arguments are respectfully requested.

In view of the above, it is respectfully submitted that the claimed invention recites the subject matter which is neither disclosed or suggested in the cited prior art. Also, it is respectfully submitted that the subject matter is more than sufficient to render the claimed invention unobvious to a person of ordinary skill in the art. Therefore, it is respectfully

requested that claims 1, 12, 15, 18, 21-41, and 51-53 be allowed and this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time
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